

(12) UK Patent Application (19) GB (11) 2 107 662 A

(21) Application No 8131912
(22) Date of filing 22 Oct 1981
(43) Application published
5 May 1983
(51) INT CL³
B60L 5/00 5/18 5/38
(52) Domestic classification
B7L 71H1 71HX 71J1
71J2 EH
(56) Documents cited
GB 1374972
(58) Field of search
B7L
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(54) Electric traction current-collector

(57) The current-collector, such as is described in United Kingdom Patent Specification No. 1 374 972, has a carbon current-collector block (1) housing a rupturable tubular container (7) for air under pressure applied through a pneumatic control system for a pantograph or other carrier so that loss of air pressure due to rupture of the container causes the current-collector block to be retracted. The container (7) is so thin that, if it is not completely housed and supported, it bursts under the applied air pressure and consequently any defect in the carbon block which spoils complete support of the container causes retraction of the current-collector.

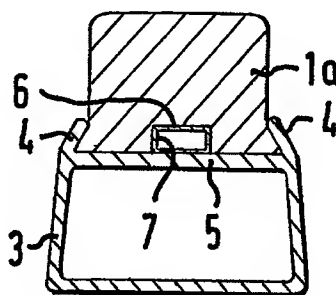
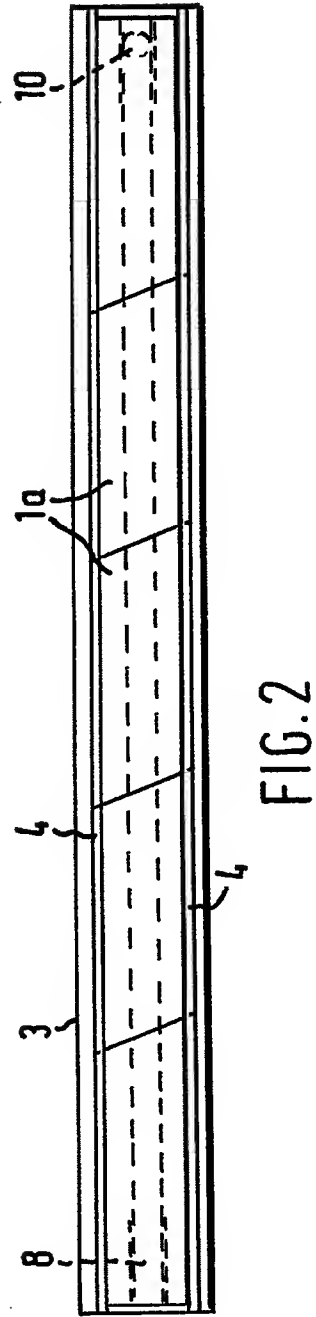
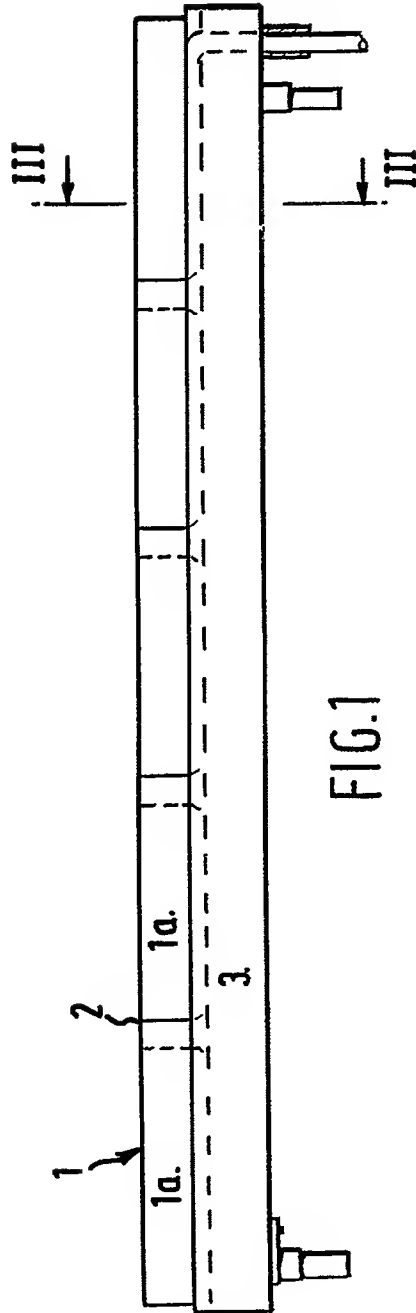


FIG. 3

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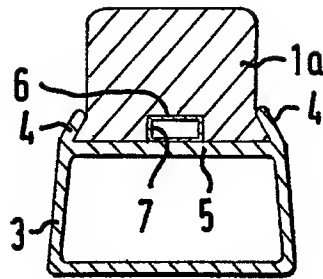


FIG. 3

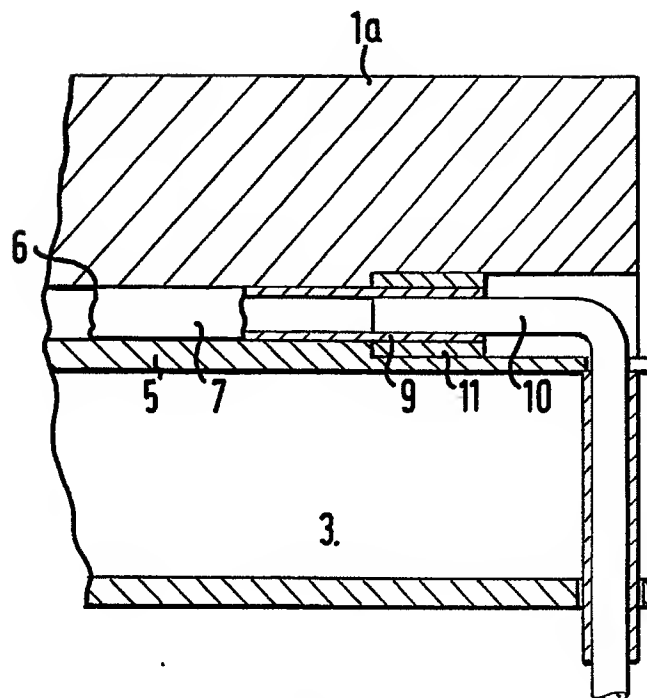


FIG. 4

SPECIFICATION

Electric traction current-collector

5 This invention relates to electric traction current-collectors and is an improvement on the invention of United Kingdom Patent No. 1 374 972 (Morganite Carbon Limited).

In the earlier invention of that Patent, a carbon
10 current-collector block, for contacting a railway overhead power conductor, houses a rupturable tubular container for fluid with means for connection to pressure-fluid operated carrier mechanism for the block, so that, on rupture of the container, the
15 collector block is retracted from the conductor.

According to the present invention, the container is so distensible and is charged with fluid under such pressure that the container will burst if it is not completely supported by its surrounding housing.

20 The container may be housed completely within the carbon block or in a channel between the carbon block and a shoe or other holder.

In use of both the earlier invention and the present invention rupture or bursting of the fluid container
25 causes such loss of pressure that the carrier mechanism, generally known as "pantograph", is operated to retract the current-collector block from contact with the overhead conductor and thus avoid damage to the conductor by a defective collector.

30 The invention is not limited to a current-collector block and carrier for an overhead conductor and may be applied to a carbon current-collector on a carrier loaded down by fluid pressure onto a conductor rail.

In the earlier invention, rupture of the fluid container is consequent only on breakage or excessive wear of the carbon block directly causing the rupture or exposing the container so that it becomes ruptured by encountering the conductor.

In the present invention, the distensible container
40 under pressure is susceptible to any defect in complete support by the surrounding carbon block so that a fault in construction or assembly or an incipient failure, such as propagation of an opening or crack in the carbon short of actual breakage, will
45 cause bursting of the container and consequent retraction of the pantograph.

In order to limit the vulnerability of the container to conditions affecting directly the operation of the current-collector block as such, the means for connection of the container to the pantograph, or other
50 carrier mechanism, comprise a substantially inextensible tubular connector joined to the container within its supporting housing so that no distensible part of the container extends outside the housing.

55 The material of the distensible container is preferably a thin-walled tube of a silicon rubber, for example of 4.0mm internal diameter and 0.35mm to 0.5mm wall thickness to be charged with air at a pressure well above 30 p.s.i. (pounds per
60 square inch). A tube of silicone rubber of 0.35mm wall thickness will burst if unsupported at 15 p.s.i. and a 0.5mm thickness tube at 20-30 p.s.i. A suitable

operating pressure in practice is 150 p.s.i. which is usually available from the air compressor of a
65 locomotive. The invention is illustrated by way of example on the accompanying drawings, in which:-

Fig. 1 is a side elevation and Fig. 2 is a plan of a carbon current-collector block and carrier shoe according to the invention,

70 Fig. 3 is a cross-section on the line III-III of Fig. 1, and

Fig. 4 is a fragmentary longitudinal section showing a tubular connector for supplying air under pressure to the distensible tube.

75 As shown by Figs. 1 and 2, the carbon block 1 is made in sections 1a, with closely-fitting oblique joints 2, held in a shoe 3, which may be of aluminium, of box-section with flanges 4 holding a dovetail-section base of the carbon block tightly
80 against a web plate 5.

Along the middle of the base of the carbon block there is a rectangular channel 6 which, together with the shoe plate 5, provides a housing for a thin distensible tube 7, such as of silicone rubber as
85 mentioned above.

One end of the tube 7 is closed at 8 and the other end 9 fits closely over an air-supply connector pipe 10, of metal or rigid plastics material, around which it is sealed air-tight by a heat-shrunk clamping band
90 11.

Air under pressure is supplied to the tube 7 through the pipe 11 from a pantograph or other carrier pneumatic control system (not shown) which operates to maintain the carbon block against its conductor only as long as a given air pressure is maintained in the pneumatic system. Should air pressure drop due to rupture of the tube 7, or otherwise, the control system operates to cause retraction of the carbon block from its conductor. A
100 suitable control system is described in the above-mentioned patent specification No. 1 374 972 and may be used in conjunction with the present invention.

The housing of the tube 7 by the channel 6 and shoe plate is so complete that the tube is supported throughout against distension beyond its bursting point by the applied air pressure.

Should there be any disturbance of the support of the tube 7 by its housing, for example cracking, breakage or displacement of a carbon block section 1a, such that the tube 7 is no longer fully supported, the tube 7 will expand locally and burst. The consequent loss of air pressure in the control system will cause retraction of the carbon block from its
115 conductor.

CLAIMS

1. A carbon-collector block, for contacting a railway power conductor, housing a rupturable tubular container for fluid with means for connection to pressure-fluid operated carrier mechanism for the block, characterised thereby that the container is so distensible and is charged with fluid under such pressure that the container will burst if it is not completely supported by its surrounding housing.
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2. A carbon current-collector block according to claim 1, characterised thereby that the means for connection of the container to the carrier mechanism comprises a substantially inextensible tubular connector joined to the container within its supporting housing and no distensible part of the container extends outside its housing.
- 5
3. A carbon current-collector block with a distensible fluid-container substantially as described with reference to the accompanying drawings.
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Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd.,
Berwick-upon-Tweed, 1983.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.